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| 19 | **PRC Organizations Responsible for Strategic Missile and Space Development Programs** | The PRC's development organizations for strategic missiles and space vehicles are centered in the Seventh Ministry of Machine Building, which comprises five research academies—a developmental integrating contractor and four subsystems developmental organizations. |

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| 25 | A<br>B<br>C | **China's First Launch of a CSS-X-4 ICBM From a Silo (7 January 1979)** | A CSS-X-4 ICBM launched from a silo by the Chinese on 7 January 1979 provided information that may be used to predict future silo R&D tests from the Wuzhai Missile Test Center. |

# PRC Organizations Responsible for Strategic Missile and Space Development Programs

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## Summary and Conclusions

The Seventh Ministry of Machine Building of the People's Republic of China (PRC) consists of five research academies that are responsible for the development of strategic missiles, space launch vehicles (SLVs), and spacecraft. Four of the academies develop major subsystems and one probably is the overall contractor for systems integration. An analysis of all available information on the research academies permits the confident identification of functions for each, as follows:

- First Research Academy, Beijing (Peking)/ Nanyuan (Nan-yuan). Probably the overall contractor for integration of strategic missile and SLV systems. This academy is supported by the other four academies, which perform subsystems research. The First Academy probably has developed all PRC strategic missiles and SLVs up to this time.
- Second Research Academy, Beijing. Research and development (R&D) of missile guidance and control systems and probably of some SLV electronics.
- Third Research Academy, Beijing/Changxindian (Ch'ang-hsin-tien). R&D of missile and SLV liquid-propulsion systems and aerodynamics research related to propulsion and airframes.
- Fourth Research Academy, Hohhot (Hu-ho-hao-t'e). R&D of composite-solid-propellant rocket motors for strategic missiles.
- Fifth Research Academy. Development of spacecraft and related ground and onboard satellite equipment.

These research academies provide China with the necessary technological and industrial base for conducting significant missile and space development programs. The Seventh Ministry of Machine Building appears to have taken a cautious approach to missile and space development. The number of programs has been small and the pace of development and testing has been slow. However, China appears to be committed to a major modernization program, and that implies a more vigorous pursuit of missile and space projects in the future.

## Discussion

### Introduction

The Chinese defense industry is centered in the Second through the Seventh Ministries of Machine Building.[1] The Chinese machine building ministries are responsible for the development and production of all PRC weapons. They operate under the State Council and are each responsible for specific categories of weapons and related equipment. These are: nuclear weapons (Second Ministry of Machine Building—MMB), aircraft and defensive missiles (Third MMB), defense electronics including communications (Fourth MMB), ground armaments (Fifth MMB), naval shipbuilding (Sixth MMB), and strategic missiles and space vehicles

[1] The First Ministry of Machine Building is responsible for producing general machinery primarily for the civilian economy.

(Seventh MMB). The Military Commission of the Central Committee of the Chinese Communist Party, acting for the Party leadership, establishes weapons and space programs and their relative priorities. The National Defense Scientific and Technological Commission (NDSTC) serves as overall supervisor of military R&D and arranges for and monitors missile and space programs. In overseeing these programs, it works closely with the defense-related ministries.

In recent years, much new information from a variety of sources has become available that can be related to Chinese missile and space organizations. This information allows us to piece together what appears to be the organizational setup for the conduct of PRC ballistic missile and space development programs.

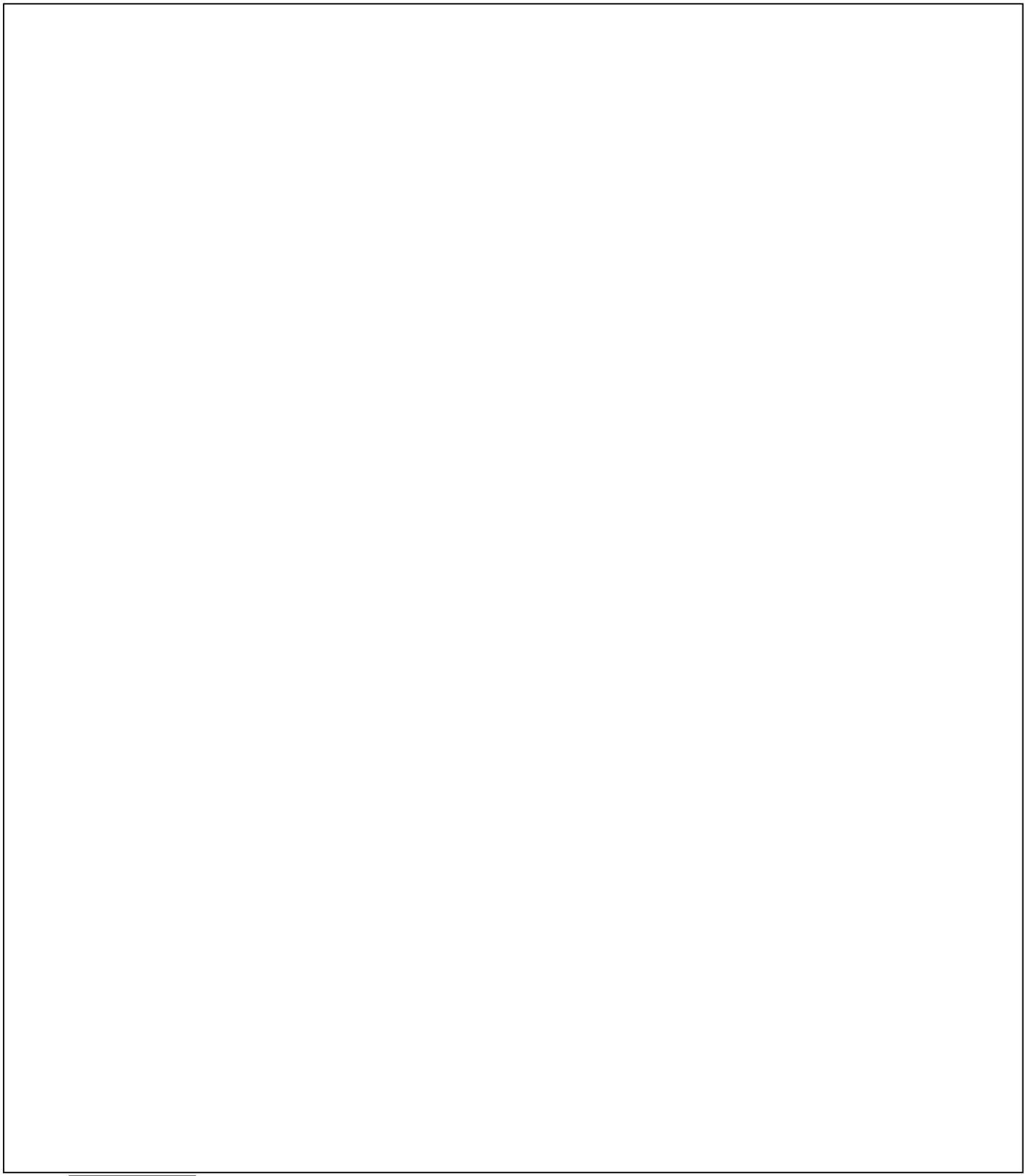
The Seventh Ministry of Machine Building is responsible for the development of Chinese strategic missiles, SLVs, and spacecraft. In order to understand how missile and space systems are developed in China, it is necessary to examine the organization of this ministry. The Seventh Ministry of Machine Building comprises five research academies, each of which appears to have particular development responsibilities for missile and space systems.

**First Research Academy, Beijing/Nanyuan**

This academy probably is the integrating contractor for the development of Chinese strategic missile and SLV systems. As such, it is supported by the other four research academies of the Seventh Ministry of Machine Building, which are responsible for the development of major missile- and space-related subsystems. The First Research Academy is located in Beijing's southern suburb of Nanyuan. Its Nanyuan

Beijing, however. The academy is probably colocated with and may be the Chinese designation for a large airframe development and prototype production facility known in the Intelligence Community as the Beijing Guided Missile Plant, Nanyuan. There is firm evidence that the academy existed in 1965, soon after the formation of the Seventh Ministry of Machine Building. Other, less conclusive, evidence suggests that it predated that ministry by at least four years.

Analysis of information from various sources indicates that the Beijing Guided Missile Plant, Nanyuan, performs the role of integrating contractor for the development of strategic missile and space launch



**Third Research Academy**

The Third Research Academy was first identified in 1968 in Chinese press reports. It is located in the Changxindian area of Beijing, as indicated by the fact

The name of the academy may be the designation of the Seventh Ministry of Machine Building for the large center for liquid-propulsion R&D known in the Intelligence Community as the Beijing Guided Missile Development and Production Center, Changxindian. This center was constructed with Soviet assistance beginning in about 1959. Little is known about the organizations subordinate to the Third Academy. However, former Premier Zhou Enlai (Chou En-lai) referred to the academy in April 1968 as comprising nine large units. These units probably consist of a group of research institutes and at least two factories (No. 159 and No. 558).

The Fourth Research Academy probably is the major center in China for the R&D of solid-propellant rocket motors for strategic missiles. The academy was first identified at Hohhot in 1966. Although its exact location in Hohhot is not confirmed, it undoubtedly is part of the large composite-solid-propellant rocket motor complex known in the Intelligence Community as the Hohhot Solid-Propellant Complex. There is information that suggests the Fourth Academy is the designation of the Seventh Ministry of Machine Building for the Hexi (Ho-hsi) Chemical Corporation and for the Hohhot complex.

Little detailed information is available on the organization of the Fourth Academy other than the identity of one subordinate organization—the No. 44 Institute.

**Fifth Research Academy**

The Fifth Research Academy probably is the classified name of the Academy of Space Technology, an organization responsible for spacecraft development and on which considerable information has become available in the past year. This organization is headed by Ren Xinmin, who also is a vice minister of the Seventh Ministry of Machine Building. Although the Academy of Space Technology was identified only last year, there is more information available on its organization, responsibilities, and activities than on any other research academy of the Seventh Ministry.

the responsibilities of the academy are spacecraft development and have provided details of work under way. The academy currently appears to be concentrating on the development of communications satellites.

According to Ren Xinmin, the Academy of Space Technology is a project management agency that was established in 1968 to coordinate the space program. It apparently evolved from an organization set up in 1965 under the NDSTC and known as the 651st Group.

That the Fifth Research Academy is the classified name of the Academy of Space Technology is based on the strong likelihood that the Fifth Academy's 505th Research Institute in Xi'an (Sian) and the Xi'an Radio Technology Institute, which Ren identified as an institute subordinate to the organization he heads, are one and the same. We believe that other Fifth Academy institutes—Nos. 502, 503, and 504—correspond to institutes of the Academy of Space Technology

Ren Xinmin has identified four institutes, three factories, and a test facility as subordinate to the Academy of Space Technology. One of the institutes is the Beijing Institute of Control Engineering, which is responsible for the R&D of attitude control systems for satellites (it also has been called the Institute of Satellite Attitude Control) the Institute of Control Engineering and have confirmed its work on satellite control systems. It probably is part of the former Institute of Automation of the Chinese Academy of Sciences.

Ren Xinmin identified an organization designated the Overall Design Department as another of the institutes subordinate to the Academy of Space Technology. He described this department as being responsible for the overall design of spacecraft and for thermal and mechanical design

A third institute subordinate to the academy, according to Ren, is the Xi'an Radio Technology Institute. We believe that this is the 505th Institute of the Fifth Research Academy because of the similarity of responsibilities in space communications. Also, two of the leading officials of the Xi'an institute previously were identified with the 505th Institute (the Director, Qian Ji, and an engineer, Zhou Tonghao). Another source has linked the 505th Institute with the development of equipment for sounding rockets early in the Chinese space program.

The fourth institute identified by Ren as subordinate to the Academy of Space Technology is the Lanzhou (Lan-chou) Low-Temperature and Vacuum Institute. It is responsible for R&D in cryogenics and high-vacuum technology related to spacecraft. the institute was involved in the development of a rocket propulsion system using liquid hydrogen as of at least 1973. This R&D probably involved studies of cryogenic fuel and handling rather than actual engine development. development of cryogenic propellants and have stated that an explosion involving liquid hydrogen three to four years ago resulted in casualties

One of the three factories subordinate to the Academy of Space Technology is the Beijing Dongfang (Tung-fang) Scientific Instruments Factory. It is located near the Institute of Control Engineering in the Haidien (Hai-tien) District of northwest Beijing. The factory probably works closely with the institute and is responsible for the production, general assembly, and testing of satellite structures. ground-test models of the first two Chinese satellites in a large assembly building believed to be part of this factory. The factory is reported to have previously produced sounding-rocket airframes (1959-64) and internal components for the second satellite, including the solar battery. A Chinese press report in 1978 stated that the factory participates in the development of vacuum calibration apparatus. One of the uses cited was space exploration.

The other two factories identified by Ren as subordinate to the academy were two electrical equipment plants. One, in Shanghai, makes satellite electrical equipment and related ground detection equipment. Another, in Shanxi (Shansi) Province, is engaged in R&D of ground and satellite equipment. Neither of these plants had been previously identified.

The test facility that Ren identified as subordinate to the academy is the Beijing Environmental Engineering Test Station. It is responsible for environmental testing, apparently related to spacecraft and is located in Hairou (Huai-jou), northeast of Beijing.

**Outlook**

Overall, the five research academies and the specialized institutes subordinate to them comprise all the major elements of a technological industrial base for conducting missile and space development programs. While some missile and space work predates the establishment in 1964-65 of the Seventh Ministry of Machine Building, an effective management structure probably was not emplaced until that time. It appears that this basic organizational structure has remained intact since then

The Seventh Ministry of Machine Building appears to have taken a cautious approach to missile and space development. The number of programs it has conducted has been small and the pace of development testing has been slow. It is consistent with what we would expect from an emerging and inexperienced effort to organize a new and advanced industrial base indigenously. Without extensive support outside the PRC for sophisticated missile and space programs, and with little aerospace development experience, the Chinese have had to embark on building an advanced technological industrial base from scratch. China's modernization programs for the next 10 years imply a more vigorous pursuit of missile and space projects. The Chinese may expect that, with the experience gained from earlier programs, their development organizations will be able to undertake new programs with increased confidence.